KIELANOWSKI, Tadeusz

Phthisiatrics of pneumatology. Polski tygod. lek. 11 no.27: 1235-1237 2 July 56.

1. Z Kliniki Ftyzjatrycznej Akademii Medycznej w Gdansku, kierownik: prof. dr. T. Kielanowski. Gdansk, Akad. Med. Klinika Ftyzjatryczna.
(TUBERCULOSIS, PULMONARY,
replacement of term phthisiatrics with pneumatology (Pol))

KIELANOWSKI, T.; BROKMAN, S.; DOWGIRD, A.; FAFROWICZ, B.

Five years at the Phthisological Hospital of the Academy of Medicine at Bialystok. Gruzlica 25 no.3:251-253 Mar 57.
(TUBERCULOSIS, PULMONARY, statist.
hosp. statist. (Pol))

KIELANOWSKI, Tadeusz

Typhobacillosis Landouzy, spurious syndrome of symptoms of non-localized acute tuberculosis. Gruzlica 28 no.8:641-644 Ag-'60.

1. Z Kliniki Ftyzjatrycznej A.M. w Gdansku Kierownik: prof. dr T.Kielanowski.
(TUBERCULOSIS diag.)

KIELARSKI, Eugeniusz

Ten years in Polish geological service. Przegl geol 11 no.4:173-177 Ap '63.

1. Dyrektor Wydawnictw Geologicznych, Warszawa.

MARCZYNSKI, Jozef, mgr inz.; KIELB, Szczepan, mgr inz.

The Bipromet Designing Office of Nonferrous Metallurgy. Rudy i metale 9 no.7:370-377 Jl '64.

1. Director, Bipromet Designing Office of Nonferrous Metallurgy Katowice (for Marczynski).
2. Chief Engineer, Bipromet, Katowice.

KIELBASINSKI, A. (Warszawa)

On the iterative procedures of best strategy for inverting a self-adjoint positive-definite bounded operator in Hilbert space. Studia math 24 no.1:13-23 '64.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510020-2"

BURNAT, M.; KIELBASINSKI, A.; WAKULICZ, A.

The method of characteristics for a multidimensional gas flow. Archiw mech 16 no.2:179-187 '64.

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Nuclear fission; a bibliography. Pol atom energy review no.7: 1-87 '63

1. Information Center of the Polish Atomic Energy Commission, Warsaw.

~~KELBASINSKI,~~ L. [Kielbasinski, L.] (Varshava)

The Polish sector of the "Druzhba" pipeline in operation. Stroi. truboprov. 9 no.12:12-13 D '64. (MIRA 18:3)

KIELBASINSKI, S.

Ch

30

Synthetic rubber from alcohol. Stanisław Kiełbasiński. *Przemysl Chem.* 4, 384-91(1948); cf. *C.A.* 41, 7802. Historical. K.'s participation in Russian and Polish research on butadiene from EtOH and on synthetic rubber during 1913-39 is described. Frank Gonet

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KIELBASINSKI, W.

POLAND/Chemical Technology - Chemical Products and Their Application, Part 4. - Artificial and Synthetic Fibers. H-31

Abs Jour : Ref Zhur - Khimiya, No 7, 1958, 23440

Author : W. Kielbasinski, A. Kaszynski
Inst : -
Title : Comparative Data of Reaction Duration in Some Continuous Action Equipment for Viscous Fiber Production.

Orig Pub : Przem. chem., 1957, 13, No 5, 249-256

Abstract : Bibliography with 4 titles.

Card 1/1

KIELBASINSKI, Witold, mgr inz.

World prospects for cut viscose fiber. Chemik 16 no.3:72-75 Mr '63.

1. Instytut Wlokien Sztucznych i Syntetycznych, Lodz.

KARABASINSKI, Witold, mgr inz.

Problem of developing the production of viscose cord in the light of the progress in the production of automobile ties. Chemik 17 no.3:99-103 Mr '64

1. Institute of Artificial and Synthetic Fibers, Lodz.

POLAND / Chemical Technology. Chemical Products and Their Applications. Carbohydrates and Their Processing. H-26

Abs Jour: Ref Zhur-Khimiya, No 3, 1959, 9920.

Author : Kielbaska, J.
Inst : Not given.
Title : Canesugar Industry in India.

Orig Pub: Gaz. cukrown., 1958, 60, No 2, 47-50.

Abstract: Characteristics of the industry, description of the refining technology and use of waste products. -- Ya. Shteynberg.

Card 1/1

206

AICHBINSKA, Stefania; PIATKOWSKI, Zbigniew

Ovarian neoplasms according to data of the Institute of Oncology in Warsaw (1947 - 1957). Nowotwory 4 no.4:367-374 O-D '6?

1. Z Oddzialu Onkologii Ginekologicznej Instytutu Onkologii w Warszawie (Kierownik: doc. dr. med. L. Tarlowska) i z [illegible]ialu Rentgenoterapii (Kierownik: doc. dr. med. W. Cukiersztajn; Dyrektor: prof. dr. med. W. Jasinski).

SMIGIELSKI, J.; KIELBINSKI, J.

Preliminary results of investigations on magneto-gas-dynamic phenomena in the case of pulsating combustion. Bul Ac Pol tech 12 no. 3:211-218 '64.

1. Institute of Fluid Flow Machines, Gdansk, Polish Academy of Sciences. Presented by R. Szewalski.

KIELBINSKI, M., mgr. inz.

"The proper selection of machine tools for machining" by Friedrich Frey. Reviewed by M. Kielbinski. Mechanik 35 no.8:467 Ag '62.

KIELBINSKI, M., mgr inz.

"Grinding machine" by M. Korycinski, M. Czarniawski. Reviewed by M. Kielbinski. Mechanik 35 no.12:683 D '62.

KIELBRATOWSKI, J.

Damages to locomotives en route in the 1st half, of 1956.

P. 269 (Przeglad Kolejowy Mechaniczny. Vol. 8, no. 9, Sept. 1956, Warszaw, Poland)

Monthly Index of East European Accessions (EEAI) LC. Vol.7, no. 2, February 1958

KIELBRATOWSKI, J.

The progress in railroad traction in the Soviet Union.

P. 290 (Przeglad Kolejowy Mechaniczny. Vol. 8, no. 10, Oct. 1956, Warszawa, Poland)

Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 2,
February 1958

KIELBRATOWSKI, Josef, inz. mgr.

Research on the dynamic action of rail vehicles on the tracks.
Przegl kolej mechan 13 no.1:27-29 Ja '61.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510020-2"

KIELBRATOWSKI, Jozef

Development of combustion engine traction. Przegl kolej mechan 14 no.9: 263-268 S '62.

1. Centralny Osrodek Budowy i Rozwoju Techniki Kolejnictwa, Warszawa.

KIELBRATOWSKI, Jozef, mgr inz.

Automatic couplers. Przegl kolej mechan 13 no.10:301-304
O '61.

KIELBRATOWSKI, Jozof, mgr inz.

Testing draft installations in locomotives. Przegl kolej mechan 13 no.7:205-209 J1 '61.

KIELBRATOWSKI, Jozef

Railroad passenger cars, COB-M3 type. Przegl kolej mechan 11 [i.e. 16] no.3:74-76 Mr '64.

1. Central Institute for Research and Development of Railway Techniques, Warsaw.

KIELBRATOWSKI, Jozef

Heating of the slide bearings of freight cars on electrified lines. Przegl kolej mechan 11 no.10:232-236, 245 0 '64

1. Central Institute for Research and Development of Railway Techniques, Warsaw.

MILGROM, Feliks; GOLEBIOWSKA, Janina; KIELCZEWSKA, Halina

Studies on parabiosis. I. Effect of antihistaminics.
Arch. immun. ter. dosw. 3:393-396 1955.

1. Instytut Immunologii i Terapii Doswiadczalnej PAN we Wroclawiu (Dyrektor: prof. dr. L. Hirszfeld) Dzial Immunologii Szczegolowej (Kierownik: prof. dr. F. Milgrom).

(ANTIHISTAMINICS, effects,
on survival of mice in parabiosis (Pol))
(PARABIOSIS,
eff. of antihistaminics on survival of mice in
parabiosis (Pol))

MANSKI, Wladyslaw; KIELCZEWSKA-RDULTOWSKA, Halina

Compound complement in Wassermann reaction. Med. dosw. mikrob. 10 no.3: 321-326 1958.

1. Z Instytutu Immunologii i Terapii Doswiadczalnej im. Ludwika Hirszfelda.

(WASSERMAN REACTION,
compound complement (Pol))

KIELCZEWSKA-RDULTOWSKA, Halina

Occurrence and properties of bacteriophages specific for the genus mycobac~~terium~~. Arch.immun.ter.dosw. 9 no.3:551-571 '61.

1. Department of Medical Microbiology, School of Medicine, Warsaw.

(MYCOBACTERIUM) (BACTERIOPHAGE)

KIELCZEWSKA, MARIA

Kielczewska, Maria O podstawy geograficzne Polski. Poznan, Wydawn. Instytutu Zachodniego, 1946. 146 p. (Prace Instytutu Zachodniego, nr. 10) (Poland's geographic bases. Maps)

SO: Monthly list of East European Accessions, LC, Vol. 3, No. 1, Jan. 1954. Uncl.

KIELCZEWSKA-ZALEWSKA, Maria

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KIELCZEWSKA-ZALESKA, M.

KIELCZEWSKA-ZALESKA, M. A joint conference and courses of the Institute of Geography, Polish Academy of Sciences, and the Ministry of Higher Education devoted to problems of economic geography. p. 678.

Vol. 28, no. 3, 1956
ATLAS POLSKICH STROJOW LUDOWYCH
Poland

So: East European Accession, Vol. 6, No. 5, May 1957

KIELCZEWSKA-ZALESKA, Maria

Trends in the development of anthropogeography in Poland. Przegl geogr 30 no.3:403-419 '58. (EEAI 9:8)
(Poland--Anthropogeography)

KIELCZEWSKA-ZALESKA, Maria

The problem of the economic changes of small towns in Poland. Przegl geogr Suppl.to 32:211-220 '60. (EEAI 10:4)

1. Academie Polonaise des Sciences, Institute de Geographie, Varsovie.
(Poland--Cities and towns)

KIELCZEWSKA-ZALESKA, Maria

New trends in historicogeographical studies on rural settlements. Przegl geogr 35 no.1:3-19 '63.

KIELCZEWSKA-ZALESKA, Maria

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KIELCZEWSKA-ZALESKA, Maria

"Town planning activities of Polish magnates and noblemen in Poland of the 18th century" by W.Trzebinski. Reviewed by Maria Kielczewska-Zaleska. Przegl geogr 35 no.4:729-732 '63.

Maximilien Sorre, 1880-1962. 751-752

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510020-2"

KIELCZEWSKA-ZALESKA, Maria

Development of geographic studies on the rural colonization in Poland. Czasop geograf 35 no.3/4:337-353 '64

With reference to Professor G. Chabot's visit to Poland. Ibid.:457

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Geograph[illegible]
Republic. Przegl [illegible] 36 no.3 [illegible]

KIELCZEWSKI, B

"Oilseed Plant Culture On Light Soils." p.20 (Plon, Vol. 5, No. 2, Feb. 1954, Warszawa)

SO: Monthly List of ~~Russian~~ East European Accessions, Library of Congress, Vol. 3, No. 6, June ~~1953~~ 1954, Uncl.

P

POLAND / General and Specialized Zoology - Insects.

Abs Jour : Ref Zhur - Biologiya, No 5, 1959, No. 20892

Author : Kielczewski, Bogdan
Inst : ~~Poznan Society of the~~ Friends of Science
Title : The Bioecology of Thrips lini Lind.

Orig Pub : Prace Komis. nauk roln. i lesn. Poznanskie towarz. przyjaciol nauk, 1957, 3, No 8, 14s

Abstract : In 1945, in Poland the mass appearance of the flax thrips was noted. In 1953-54, in the Poznan area, the first insects of Thrips appeared in the middle of May and the last on September 2nd, after the flax was harvested. In fighting the Thrips, the early use of DDT and hexachlorocyclohexane is advised, but is not expedient in late summer when the parasites of Thrips make an

Card 1/2

41

KIELCZEWSKI, Bohdan (Poznan)

Biological rhythms of the organism. Wszechswiat no.2: 41-42 F '65.

KIELCZEWSKI, Bohdan; CZAPSKA, Maria

Ethology of ectoparasites during daily rhythm. Wiad. parazyt. 11 no.1:183-187 '65.

1. Katedra Ochrony Lasu Wyzszej Szkoly Rolniczej, Poznan.

M-4

POLAND / Cultivated Plants. Commercial.
Sugar Bearing.

Abs Jour	:	Ref Zhur - Biologiya, No 2, 1959, No. 6348
Author	:	Horodyski, Andrzej; Jablonski, Miron; Kielczewski, Bogdan
Inst	:	Not given
Title	:	The Effect of the Sowing Density on the Yield of Seeds and the Oiliness of Sunflowers with Varying Degrees of Fertilization
Orig Pub	:	Wydawn. wlasne, Inst. uprawy, nawozenia i globoznawstva, 1957, No 61, 146-161
Abstract	:	Field experiments, carried out on an experimental field in Przibrode in 1951-1953 with the Bronovskiy Polosatyy (striped) variety are described in this paper. The lowest level of fertilization corresponded to $P_{30}K_{60}N_{20}$ and

Card 1/2

KIELCZEWSKI, Bogdan

Studies on parasitic mites in wild rodents. Wiadomosci parazyt., Warsz. 4 no.3:207-210 1958

1. Z Zakladu Ochrony Lasow Wyzszej Szkoly Rolniczej w Poznaniu.
(MITES,
parasitims on wild rodents (Pol))
(RODENTS,
mites parasitims in wild cond. (Pol))

DEMBINSKI, F.; JABLONSKI, M.; HOFFMANNOWA, A.; KIELCZEWSKI, B.

Effect of the width of plant tows on seed yolds of three domestic castor-oil plant varieties. Rocz nauk roln rosl 81 no.3:545-560 '60. (EEAI 9:10)

(Poland--Castor-oil plant)

KIELCZEWSKI, Bohdan; WISNIEWSKI, Jerzy

Research on the acarofauna of nests of Formica rufa L. and Formica polyctena Först. with reference to the accompanying Arthropoda. Prace nauk roln i lesn 13 no.1:3-14 '62.

1. Katedra Ochrony Lasu, Wyzsza Szkola Rolnicza, Poznan.

KIELCZEWSKI, Bohdan, prof. dr

Symposium of sport biometeorology. Problemy 20 no.11:698-699 '64.

KIELCZEWSKI, Bohdan; KASHYNA, Edmund

Acarofauna of the coniferous cultures and saplings of the Zielonka Experiment Forest District of the School of Agriculture. Prace nauk roln i lesn 17 no.3:377-383 '65.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510020-2"

KIELCZEWSKI, M.

Optical rotatory dispersion of naphthalenesulfinylacetic acids. Bul chim PAN 12 no.12:849-851 '64.

1. Department of Organic Chemistry of A.Mickiewicz University, Poznan. Submitted October 7, 1964.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510020-2"

KIELCZEWSKI, S. ; TOTA, A.

The right criteria of the organization of milling enterprises.

P. 5. (PRZEGLAD ZBOZOWO-MLYNARSKI) (Warszawa, Poland) Vol. 1, no 8, Nov. 1957

SO: Monthly Index of East European Accession (EEAI) LC Vol. 7, No. 5, 1958

KIELCZEWSKI W.

3666 661.183.123.3 : 545.34

Kielczewski W. Application of an Anion Exchanger for Quantitative Separation of Cations. CH

„Zastosowanie anionitu do ilościowego rozdzielania kationów", Roczniki Chemii (PAN). No. 3, 1954, pp. 493—498, 3 tabs.

On a resin obtained from urea and formaldehyde, acting as an anion exchanger, a separation, by percolation through a column, was achieved of certain cations present in a solution. On resin saturated with phosphoric anion a separation was achieved of the following pairs of cations: 1) iron-copper, 2) iron-nickel, 3) iron-cobalt. The separation was brought about by secondary reactions taking place between the polivalent anion retained by the resin and the cation reacting with this anion.

KIELCZEWSKI, W

Estimation of small quantities of zinc. Anselm Lewandowski and Wladyslaw Kielczewski (Univ. Poznań, Poland). Roczniki [illegible] summary).—To det. Zn in Zn salts, transfer the sample to paper strips impregnated with uranyl ferrocyanide (on Whatman #1) or dithizone (on Schleicher and Schüll 2090-1), hang over a hot H_2O bath with the end nearest the test spot immersed in H_2O. To diminish the rate of flow of H_2O, the lower ends can be cut narrower and glycerol can be added to the H_2O. A few γ of Zn were detd. within ±3% of the truth. L. J. Piotrowski

KIELCZEWSKI, WLADYSLAW

7

POLON

Application of an anion exchanger for quantitative separation of cations. Wladyslaw Kielczewski (Univ. Poznań, Poland). *Roczniki Chem.* 28, [illegible] (English summary).—An anion exchanger satd. with a multivalent anion sorbs cations. The anion exchanger obtained from urea and formaldehyde was satd. in the column with dil. H_3PO_4. Fe^{+++} in the mixts. with Cu^{++}, Ni^{++}, or Co^{++} was percolated through the column, and sepd. on the exchanger, leaving in the filtrate Cu^{++}, Ni^{++}, or Co^{++}. It is supposed that the reaction is $H_2PO_4^- + A(\text{anionit}) \rightarrow AH_2PO_4$. Fe^{+++} exchanges with one or both H, and gives a new insol. compd.

Victor von Jacobi

CH

KIELCZEWSKI, W.

Poland/Analytical Chemistry - Analysis of inorganic substances G-2

Abs Jour : Referat Zhur - Khimiya, No 3, 1957, 8430

Author : Lewandowski, A. and Kielczewski, Wiesław
Inst : Not given
Title : Microchromatographic Quantitative Estimation of Copper and Lead by the Impregnation Method

Orig Pub : Roczn. chem., 1956, Vol 30, No 1, 275-280 (in Polish with summaries in English and Russian)

Abstract : Microgram quantities of copper (I), I and zinc (II), lead (III), and III in the presence of II have been determined by paper chromatography. Whatman No 1 paper was used, impregnated with uranyl ferrocyanide or barium iodate (IV). A technique is described for the washing and development of the spots formed by the reaction of the cation under investigation with the impregnating reagent; a method based on the impregnation of the paper with IV is also discussed. It has been established that the amount of the unknown substance is directly proportional to the area of the spot which is produced. The amount of substance in an unknown

Card 1/2 -14-

Kielczewski, W.

[illegible] measured. Chlorides, bromides and iodides do not interfere. Procedure—Impregnate a strip of Whatman No. 1 filter-paper (14 cm × 8 cm) with 0·02 N $K_4Fe(CN)_6$, allow to dry and then cut into strips 1·5 cm wide. Immerse the strips in 0·02 N uranyl nitrate, rinse with water and dry at 70°. Transfer the sample solution (about 3 µl) by means of a micro-pipette on to the prepared filter-paper. Hang the paper inside a glass cylinder (1·5 cm in diam. and 7·5 cm high) containing about 20 ml of a glycerol - water mixture (1:3). Place the cylinder on a boiling-water bath and cover it with a glass plate. Allow the liquid to spread in the paper. When the solvent front has reached the upper part of the paper, remove the paper and dry it at 70°. Measure the area of the white spot. Prepare a calibration curve with 5 to 15 µg of F^-. The method was found to be satisfactory for determining fluoride in apatite, fluorite, tooth enamel, etc., and gave an error <5%. K. R. Spencer

POLAND / Analytical Chemistry. Analysis of Inorganic Substances. E-2

Abs Jour: Ref Zhur-Khimiya, No 1, 1959, 983.

Author : ~~Kielczewski, W.~~
Inst : Not given.
Title : The Determination of Microgram Quantities of Four-Substituted Sodium Pyro-Phosphate by the Application of Impregnated Paper.

Orig Pub: Chem. analit., 1957, 2, No 4, 336-339.

Abstract: For the determination of $Na_4P_2O_7$ ($\leq$ 15 grams P), filter paper impregnated with copper ferrocyanide is used. The paper is soaked in a 0.005 M solution of $K_4Fe(CN)_6$, dried at 70-90°C., is cut into strips of 8 centimeters long and 1.4 centimeters wide, immersed into 0.01 M solution of cupric ni-

Card 1/2

COUNTRY : Poland
CATEGORY :

17607

ABS. JOUR. : RZKhim., No. 5 1960, No.

AUTHOR : Kielczewski, W.
INST. : Not given
TITLE : The Determination of Microgram Quantities of Reducing Sugars on Impregnated Paper

ORIG. PUB. : Chem Analit (Poland), 4, No 1-2, 151-155 (1959)

ABSTRACT : 1 ml of reducing sugar (RS) solution containing $\geq$ 1/40,000 mol per 100 ml solution, is heated for 3 min with 1 ml of modified Fehling solution (a mixture of two volumes of a solution of 34.6 gms Na-K tartrate and 10 gms NaOH in 100 ml water with one volume of a solution of 6.8 gms $CuSO_4 \cdot 5H_2O$ in 100 ml water) in a test tube placed in boiling water. After cooling, the Cu_2O is separated from the precipitate by centrifuging at 3,600-4,000 rpm, the precipitate is rinsed with water (3 times 5 ml)

CARD: 1/3

CARD: 2/3

KIELCZWESKI, W.

Determination of microgram quantities of reducing sugar by the paper impregnation method. p. 151.

CHIMIA ANALITYCZNA. Warszawa, Poland, No. 8, August 1959.

Monthly List of East Accessions (EEAI) LC, Vol. 8, No. 11 November 1959.

Uncl.

KIELCZEWSKI, Wladyslaw; TOMKOWIAK, Jan

Determination of microgram amounts of cyanide by means of impregnated filter paper. Chem anal 5 no.6:889-892 '60. (EEAI 10:9)

1. Department of General Chemistry, School of Agriculture, Poznan.

(Cyanides)

KIELCZEWSKI, Wladyslaw; TOMKOWIAK, Jan

Determination of microgram amounts of silver by means of the paper impregnation method. Chem anal 7 no.5:925-929 '62.

1. Department of General Chemistry, School of Agriculture, Poznan.

KIELCZEWSKI, Wladyslaw

[illegible]

[illegible], [illegible]

Department of General Chemistry of the Poznan [illegible] Agricultural School ([illegible] Chemii Ogolnej [illegible] Szkol[illegible], Poznan)

[illegible], Chemia Analityczna, [illegible] 6, 19[illegible], [illegible].

"Application of Anion Exchanger for Quantitative [illegible] of Silver and [illegible]".

KIELCZEWSKI, Wladyslaw; SUPINSKI, Janusz

Determination of microgram amounts of cobalt by the paper impregnation method. Chem anal 8 no.1:59-62 '63.

1. Department of General Chemistry, School of Agriculture, Poznan.

KIELCZEWSKI, Wladyslaw; MILOSZEWSKA-PODOLAK, Irena

Determination of microamounts of pyrocatechol by the filter paper impregnation method. Chem anal 8 no.1:95-98 '63.

1. Department of General Chemistry, School of Agriculture, Poznan.

KIELCZEWSKI, Wladyslaw

Application of anion exchanger for quantitative separation of silver and copper. Chem anal 8 no.5:691-693 '63.

1. Department of General Chemistry, School of Agriculture, Poznan.

POLAND

KIELCZEWSKI, Wladyslaw, prof. dr; UCHMAN, Waldemar, mgr

Dept. of General Chemistry, Agricultural College (Katedra Chemii Ogolnej Wyzszej Szkoly Rolniczej), Poznan (for both)

Warsaw, Chemia analityczna, No 3, May-June 1966, pp 543-545

"Determination of nitrites and nitrates by paper-impregnation method."

BIERNAT, Stanislaw; KIELCZYNSKA, Krystyna

A case of cystic lung degeneration in a 4-month-old infant. Pediat. Pol. 37 no.1:83-88 Ja '62.

1. Z Zakladu Anatomii Patologicznej WAM w Lodzi Kierownik: prof. dr med. A. Pruszczynski i ze Szpitala Chorob Dzieciecych im. Jakubowskiego w Lodzi Dyrektor: dr med. H. Konczynski.

(LUNG DISEASES in inf & child)

WESOLOWSKI, Kornel; KIEDRZYNSKI, Zdislaw

Ultrasonic analysis of lead-antimony and lead-tin alloys.
Metal i odlew no.7:207-220 '61.

1. Katedra Metaloznawstwa, Politechnika, Warszawa.

KIELEK, W. mgr inz.

Transistor counting decades. Lacznosc Wroclaw 5:42-54 '62.

Gating circuits used in digital time and frequency reading meters. 79-85

Frequency reducers used in digital frequency and time meters. 86-90.

The FL-25-61 electronic frequency and time meter. 101-104

The electronic millisecond meter, model SL 95. 105-106

1. Katedra Urzadzen Radiotechnicznych, Politechnika, Warszawa.

L 62153-65
ACCESSION NR: AP5011486 PO/0026/65/013/001/0057/0064

AUTHOR: Jankowski, J.; Kielek, W.; Romaniuk, Wl. 27 25 B

TITLE: Type TMP-1 transistor proton magnetometer 10

SOURCE: Acta geophysica polonica, v. 13, no. 1, 1965, 57-64

TOPIC TAGS: magnetometer, transistor, transistor proton magnetometer, signal, precession, pulse, pulse compression, pulse counter, pulse generator, frequency, gate, limiting circuit, forming circuit, circuit, control design, signal generator, TMP-1 magnetometer

ABSTRACT: This article describes the design and control measurements of a TMP-1 magnetometer. Particular attention is paid to the induction circuit of the precession signal, inasmuch as it has not yet been adequately developed and causes great difficulties. The electronic circuit that measures the precision frequency is a typical circuit but with a larger number of elements. Particular attention is also paid to the accuracy of the measurements, and sources of error are discussed. The assembly of the magnetometer is shown in Fig. 1 of the Enclosure. After its amplification the precession signal remains in forming circuit UF as a standard

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L 62153-65
ACCESSION NR: AP5011486

and a limited pulse. In this form it gets to binary frequency reducer OB1, which is set by a cancel circuit so that the first pulse at its outlet appears after 145 input pulses are received. Thus, two electric pulses separated by 1024 or 2048 periods of input voltage are generated. The first of these pulses is retarded by about 70 msec with respect to the front of the precession signal. These pulses control the control circuit that opens gate B. When the gate is open a series of pulses of 100 kilocycles travel from a standard quartz generator to the inlet of a five-decade electronic counter equipped with an indicator. The number of standard time units (10 μsec) that elapse between the first and second pulse at the outlet of the binary frequency reducer OB1 appears on the indicator. The performance of the magnetometer is controlled by the inclusion of control voltage of a frequency of 1.5625 kilocycles from an additional binary reducer OB2 at the inlet of the limiting circuit and the forming circuit to reduce the standard frequency of 100 kilocycles. For the correct operation of the entire circuit the measurement of 2048 periods of control voltage must amount to 131072 + 1 tenths of a μsec. Measurements made at observatories, under field conditions and in water show that the magnetometer is efficient, that the systematic error is of the order of 1γ, that the accidental error is of the order of 0.5γ, and that the measurement time is 6 sec. "The authors thank Engineer Andrzej Rudzki for valuable discussions and cooperation." Orig. art. has: 15 formulas and 6 figures.

Card 2/4

L 62153-65
ACCESSION NR: AP5011486

ASSOCIATION: Zaklad Geofizlki PAN (Department of Geophysics, PAN)

SUBMITTED: 28Oct64 ENCL: 01 SUB CODE: ES, EC

NO REF SOV: 003 OTHER: 007

Card 3/4

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722510020-2"

L 62153-65

ACCESSION NR: AP5011486 ENCLOSURE: 01

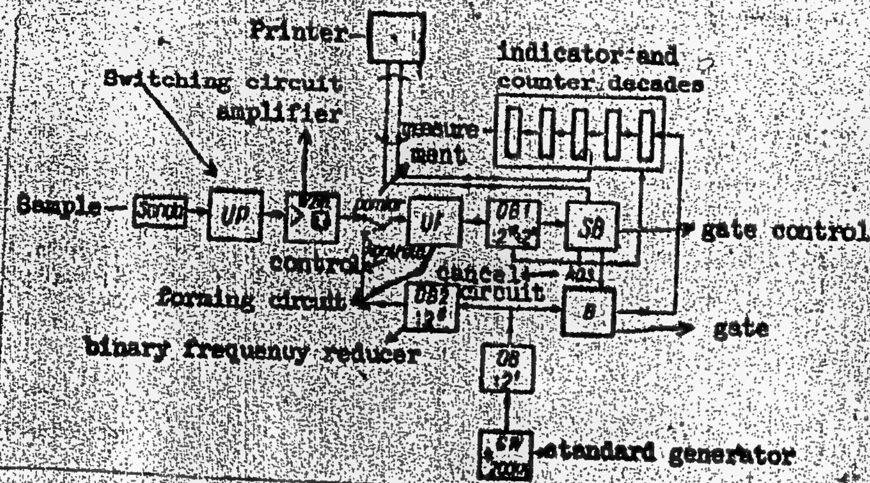

Fig. 1. Block diagram of the TMP-1 magnetometer

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34219
S/057/62/032/002/021/022
B124/B102

26.2311

AUTHORS: Zolototrubov, I. M., Novikov, Yu. N., and Kielev, V. A.

TITLE: Electrodynamic excitation of shock waves

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 253 - 255

TEXT: The electrodynamic method described by John Marshall (Second International Conference on the Peaceful Uses of Atomic Energy, Geneva, 1958) was used to excite shock waves in a tube with continuous flow of an inert gas. The basic diagram of the setup used is shown in Fig. 1 and has been described in detail by the authors (ZhTF, 31, 5, 518, 1961), where it has been used to preheat the plasma. The maximum magnetic field below the single-turn coil was 45 kilogauss and the discharge took 6 μsec. It has been established that the moments of rise of the shock waves correspond to the zeros of the magnetic field (or to the maximum induction e. m. f.). The maximum propagation rate of the shock wave ($7.5 \cdot 10^6$ cm/sec) occurs in the third halfperiod of the current when the gas around the coil has been sufficiently ionized by the waves of the preceding halfperiods. Since the alternating magnetic field depends on the distance from the coil, the

Card 1/3

S. Kielich

6

Theory of magnetic birefringence and other phenomena of molecular orientation in diamagnetic liquids. A. Piekara and S. Kielich (Univ. Adam-Mickiewicz, Poznan, Poland). J. phys. radium 18, 490-7(1957); cf. C.A. 51, 1674g.—Elec. birefringence, dielec. polarization, effect of the elec. field on the dielec. permittivity, and effect of the magnetic field on the elec. permittivity are calcd. It is assumed that the mols. are anisotropic with respect to their optical, elec., and magnetic properties and are subject to interaction with surrounding mols. The variation of the dielec. permittivity resulting from the effect of the magnetic field is related to the Cotton-Mouton and Kerr consts. Values for this variation are obtained for nitrobenzene in a magnetic field by assuming a Lorentz field or Onsager field. The molar Cotton-Mouton const. of $PhNO_2$ in a nonpolar solvent rises rapidly with the concn., whereas the elec. satn. of the dielec. polarization changes its sign to pos. H. R.

KIELICH, S.

POLAND/Optics - Physical Optics

K-5

Abs Jour : Ref Zhur - Fizika, No 2, 1959, No 4241

Author : Kielich S.
Inst : Institute of Physics, Poznan, Poland
Title : Molecular Interaction in the Classical Theory of Light Scattering.

Orig Pub : Bull. Acad. polon. sci. Ser. sci. math., astron. et phys., 1958, 6, No 3, 215-221, XVI

Abstract : A theory is proposed for the influence of molecular interaction between optical anisotropic molecules on scattering of light in liwuids. General formulas are obtained for the connection between the depolarization of the scattered light D_n and the scattering constant R, on the one hand, and the average cosines of the angles between the axes of the molecules (which figure also in the Cotton-Mouton constants C and the Kerr constants K) on the other. For the particular case, when the tensor of the polarizability of an individual molecule has an axial symmetry, these formulas

Card : 1/3

KIELICH, S.

21

Some phenomena of molecular orientation due to electric and magnetic fields. A. Piekara and S. Kielich (Polish Acad. Sci., Poznan). *Arch. sci.* (Geneva) 11, Spec. No., 304-9(1958).—The elec., magnetic, and optical effects to be expected in the regions of nonlinearity, i.e., under conditions of satn. by the same or another influence, are discussed. Formulas are given for the expected changes in dielec. const., magnetic permeability, or *n*. James H. Pannell

3

TA
1/1

POLAND/Electricity - Dielectrics

Abs Jour : Ref Zhur - Fizika, No 6, 1959, 13299

Author : Piekara, A., Kielich, S.

Inst : Institute of Physics, Polish Academy of Sciences, University in the Name of A. Mickiewicz, Poznan, Poland

Title : A Nonlinear Theory of the Electric Permittivity and Refractivity of Dielectric Liquids in Electric and Magnetic Fields.

Orig Pub : Acta Phys. polon., 1958, 17, No 4, 209-238

Abstract : A general molecular theory is given for the nonlinear effects of the orientation of molecules, produced in gases and dielectric liquid by the application of electric and magnetic fields. The following molar constants are calculated: the dielectric polarization, the Cotton-Mouton constant, the Kerr constant, and the constant of dielectric

Card 1/2

POLAND/Electricity - Dielectric.

Abs Jour : Ref Zhur - Fizika, No 6, 1959, 13299

saturation in an electric and magnetic field for gases and liquids. For liquids, whose molecules have an axial symmetry, the authors calculate the correlation factors pertaining to these constants factors which determine the interaction between the molecules in the liquid. No special assumptions are made in the derivation of the correlation factors as regards the nature of the forces acting between the molecules. For the case of an interaction leading to the production of dipole pairs, formulas are obtained (proven previously by one of the authors), in which the inversion of dielectric saturation is taken into account. Finally, a relation is derived between the change in the dielectric constant in a magnetic field and the Kerr constant or the Cotton-Mouton constant, and an estimate is made of the order of magnitude in the change of the dielectric constant in a magnetic field. Bibliography, 26 titles.

Card 2/2

POLAND/Electricity - Dielectric.

Abs Jour : Ref Zhur - Fizika, No 6, 1959, 13300

Author : Kielich, S.

Inst : Institute of Physics, Polish Academy of Sciences, Poznan, Poland

Title : Semi-Macroscopic Treatment of the Theory of Nonlinear Phenomena in Dielectric Liquids Submitted to Strong and Magnetic Fields.

Orig Pub : Acta phys. polon., 1958, 17, No 4, 239-255

Abstract : A general semi-macroscopic theory is constructed for the nonlinear effects of orientation of molecules, caused in liquids by strong electric and magnetic fields. The deviation from the quadratic effect of the dielectric saturation in strong electric fields is calculated for polar liquids with isotropically polarizable molecules.

Card 1/2

KIELICH, S

Distr: 4E3d

6

1

Theory of orientational effects and related phenomena in dielectric liquids. A. Piekara and S. Kielich (A. Mickiewicz Univ., Poznan, Poland). *J. Chem. Phys.* 29, 1297-1305(1958); cf. *Acta Phys. Polonica* 18, 200(1958).—Formulas were developed for the molar consts. of 5 nonlinear effects of mol. orientation in liquids, namely, the dielec. satn. in elec., magnetic, or optical fields and the elec. as well as the magnetic birefringence. No assumption was made concerning the nature of the intermol. forces, and no special model of mol. interaction was introduced. If the mols. can be considered to possess axial symmetry, 4 correlation factors can be derived. These factors appear in the formulas of the molar consts. of the Cotton-Mouton and Kerr effects, and of the effect of dielec. satn. in an elec., magnetic, or optical field. The correlation factors were calcd. as functions of the angle between the axes of symmetry of the *p*th and *q*th mols., in the absence of a biasing field. The theory makes it possible to predict the value of the magnetodielec. satn. effect in diamagnetic liquids, as well as the photodielec. satn., relating these phenomena to magnetic or elec. birefringence. Satisfactory results were obtained by applying the theory to such phenomena as light scattering in liquids or the lowering of the f.p., in which the orientationally dependent intermol. forces play an important part.

Henry Leidheiser, ~~Jr.~~

67143

24.2100
~~24 (3)~~

AUTHORS: Kielich, S., Piekara, A.

POL/45-18-5-5/11

TITLE: A Statistical Molecular Theory of Electric, Magnetic and Optical Saturation Phenomena in Isotropic Dielectric and Diamagnetic Media

PERIODICAL: Acta Physica Polonica, 1959, Vol 18, Nr 5, pp 439-471 (Poland)

ABSTRACT: The present paper aims at establishing a unified theory of the nine electric, magnetic and optical saturation phenomena in substances of the above mentioned properties (gases, condensed gases, fluids). For condensed media composed of polar molecules of arbitrary symmetry, anisotropically polarizable and non-linearly deformable in an external field, general expressions yielding the nine molar constants have been derived, namely: Group I - electric saturation: S_M^{ee} in an electric, S_M^{em} in a magnetic and S_M^{eo} in an optical field.

Group II - magnetic saturation: S_M^{me} in an electric, S_M^{mm} in a magnetic and S_M^{mo} in an optical field.

Group III - optical saturation: S_M^{oe} in an electric, S_M^{om} in a

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67145

A Statistical Molecular Theory of Electric, Magnetic and Optical Saturation Phenomena in Isotropic Dielectric and Diamagnetic Media SOV/45-18-5-5/11

magnetic and S_M^{oo} in an optical field.

A discussion of these molar constants is given for particular cases of spherical and axial symmetry of the molecules. For axial symmetry, the general formulas are reduced to those given previously. Moreover, expressions have been derived relating the above mentioned molar constants to the variations of the electric permittivity, of the magnetic permeability and of the optical refractive index of the medium, as resulting from the action thereon of a strong polarizing electric, magnetic or optical field. Only three of the nine possible effects under consideration have been detected until now, namely the electrooptical Kerr effect, the magneto-optical Cotton-Mouton effect, and the electric saturation in an electric field, i.e. electro-electric saturation. The authors derived equations for computing each of the six as yet unknown quantities from the known experimental Kerr and Cotton-Mouton constants. By these formulas the variations in permittivity, permeability and refractive index under the action of respective fields have been numerically computed for nitro-

Card 2/3

67145

A Statistical Molecular Theory of Electric, Magnetic and Optical Saturation Phenomena in Isotropic Dielectric and Diamagnetic Media POL/45-18-5-5/11

benzene. There are 1 table and 41 references, 1 of which is Soviet.

ASSOCIATION: Institute of Physics, Polish Academy of Sciences; A. Mickiewicz University, Poznań

SUBMITTED: February 16, 1959

4

Card 3/3

KIELICH, S.

Theory of birefringence induced in a compressed gas mixture by an electric field gradient. Bul Ac Pol mat 8 no.9:637-644 '60.

1. Institute of Physics, Poznan Branch, Polish Academy of Sciences. Presented by W. Rubinowicz.

(Gases) (Mixtures)

P/045/60/019/02/04/013
B018/B102

AUTHOR: Kielich, S.

TITLE: A Molecular Theory of Light Scattering 21 in Gases and Liquids

PERIODICAL: Acta Physica Polonica, 1960, Vol. 19, No. 2, pp. 149-178

TEXT: The author of the present paper gives an account on the general principles of a statistical molecular theory of light scattering in an isotropic medium which consists of polar anisotropic molecules. Previous work on related subjects is discussed in an introductory note; Smoluchowski (1908) was the first to prove that light scattering in optically homogeneous media arises from spontaneous thermal fluctuations of their density. The author derived a fundamental and general equation for the scattered intensity I. This equation contains the molecular factors F_{is} and F_{anis} which account for isotropic and anisotropic light scattering brought about by the molecules of the medium. These molecular factors are discussed in detail for the case of gases and liquids with molecules small as compared to the wavelength of the incident light. In such gases and liquids, F_{is} depends

Card 1/4

A Molecular Theory of Light Scattering in Gases and Liquids

P/045/60/019/02/04/013
B018/B102

on the mean polarizability of the molecule and on the radial intermolecular correlations, whereas F_{anis} depends on the symmetry and anisotropy of molecule polarizability and on the orientational intermolecular correlations. From the fundamental equation for the scattered intensity, general expressions for the optical anisotropy Δ^2 and for the degree of depolarization D of the scattered light, and for Rayleigh's ratio S and the extinction coefficient h are derived. For perfect gases, these expressions are reduced to the known formulas of Rayleigh-Born-Cabannes. For liquids with axially symmetric molecules, the expressions obtained for D, S, and h differ from those of Cabannes-King-Rocard in their anisotropic terms by the angular correlation factor R_{CM} which also appears in the formulas for the Cotton-Mouton and Kerr constants. In the case of compressed gases, the molecular factors F_{is} and F_{anis} are expanded into a power-

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A Molecular Theory of Light Scattering in Gases and Liquids

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B018/B102

series of 1/V (V denotes the volume of the system). The virial coefficients (first, second, third, etc termed A, B, C, etc plus respective indices) of isotropic and anisotropic light scattering are calculated for spherical molecules of variable polarizability and for anisotropic axially symmetric molecules which have a permanent dipole moment. Moreover, following Buckingham's method, the effect of the internal molecular field and the hyperpolarizability of molecules on light scattering in liquids is discussed. Finally, general relations between the quantities D, S, and h and formulas relating these quantities and the anisotropic term in Kerr's constant K_{anis} are derived. The relations thus obtained do not contain any molecular parameters and may serve for verifying the theory by experiments. In conclusion, the author expresses his gratitude to Professor Doctor A. Piekara for valuable advice and to Doctor A. D. Buckingham for stimulating discussions. There are 2 figures and 30 references, 2 of which are Soviet.

VC

Card 3/4

A Molecular Theory of Light Scattering in Gases and Liquids

P/045/60/019/02/04/013
B018/B102

ASSOCIATION: Institute of Physics, Polish Academy of Sciences, Poznań

SUBMITTED: June 15, 1959

Card 4/4

VC

84918

P/045/60/019/005/004/005
B011/B059

24.3600 (1106,1114,1144)

AUTHOR: Kielich, S.

TITLE: Molecular Theory of Light Scatter by Multi-component Systems

PERIODICAL: Acta Physica Polonica, 1960, Vol. 19, No. 5, pp. 573 - 597 (Poland)

TEXT: In the present paper, a general statistical-molecular theory of light scatter by multi-component systems of optically anisotropic and polar molecules is proposed. The general theory is based on the theory of Rayleigh scattering by an isotropic medium of spherical shape. The intensity component of the light scattered by the volume V and passing through the analyzing Nicol prism at the point of observation is, quite generally, given by

$$I_n = \frac{16\pi^4}{\lambda^4 R_o^2} \left\langle M_\alpha M_\beta^* n_\alpha n_\beta \right\rangle_E \qquad \text{(see Kielich 1960)},$$

where R_o denotes the distance between the point of observation and the

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84918

Molecular Theory of Light Scatter by Multi-component Systems

P/045/60/019/005/004/005
B011/B059

center of the scattering volume V; $\vec{n}$ is the unit vector perpendicular to the direction of observation and describing the plane of oscillations of the Nicol prism. α and β are summational indices running from 1 to 3. The asterisk denotes the complex-conjugate quantity. M stands for the dipole moment induced in V by the electric field $\vec{E}$ of the incident light beam, and depends on the position and orientation of all molecules in the system. The symbol $\langle M_\alpha M^*_\beta n_\alpha n_\beta \rangle_{\vec{E}}$ in the above equation denotes the statistical mean in the presence of $\vec{E}$. Assuming linear dependence of $\vec{M}$ on $\vec{E}$, the fundamental equation (2.9), together with the molecular factors of isotropic and anisotropic light scatter, F_{is} and F_{anis}, is obtained in the following form:

$$I_n = \frac{16\pi^4 I_0}{45\lambda^4 R_0^2}\{5\cos^2\Omega_{en} F_{is}(s) + (\cos^2\Omega_{en} + 3) F_{anis}(s)\} \quad (2.9)$$

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84918

Molecular Theory of Light Scatter by Multi-component Systems

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B011/B059

$$F_{is}(s) = \sum_{i,j} \left\langle \delta_{\alpha\beta}\delta_{\gamma\delta} \sum_{p=1}^{x_iN} \sum_{q=1}^{x_jN} \frac{\partial m_\alpha^{(p,i)}}{\partial E_\beta^{(p,i)}} \left(\frac{\partial m_\gamma^{(q,j)}}{\partial E_\delta^{(q,j)}}\right)^* e^{-is\cdot r_{ij}^{(pq)}} \right\rangle, \quad (2.10)$$

$$F_{anis}(s) = \frac{1}{2} \sum_{i,j} \left\langle (3\,\delta_{\alpha\gamma}\delta_{\beta\delta} - \delta_{\alpha\beta}\delta_{\gamma\delta}) \sum_{p=1}^{x_iN} \sum_{q=1}^{x_jN} \frac{\partial m_\alpha^{(p,i)}}{\partial E_\beta^{(p,i)}} \left(\frac{\partial m_\gamma^{(q,j)}}{\partial E_\delta^{(q,j)}}\right)^* e^{-is\cdot r_{ij}^{(pq)}} \right\rangle, \quad (2.11)$$

X

Ω_{en} denotes the angle between $\vec{e}$ (a unit vector in the direction of $\vec{E}$) and $\vec{n}$; $\vec{r}_{ij}^{(pq)} = \vec{r}_j^{(q)} - \vec{r}_i^{(p)}$ is the vector connecting the centers of the p-th and q-th molecules of the i-th and j-th kind. In the following, the author discusses the factors F_{is} and F_{anis} for several molecular models, such as anisotropic molecules with constant polarizability, molecules with permanent dipole moments and hyperpolarizability - here, articles by Buckingham and Stephen (1957), Onsager (1936), and Piekara (1950) served as a basis -,

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Molecular Theory of Light Scatter by Multi-component Systems

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and non-dipolar molecules with quadrupole moments and hyperpolarizability. These discussions show that the molecular factors of isotropic and anisotropic light scatter contain molecular constants accounting for the electro-optical properties of isolated molecules, such as polarizability, hyperpolarizability, and permanent dipole or quadrupole moments. Moreover, F_{is} depends on the radial intermolecular correlations, whereas F_{anis} depends on the angular intermolecular correlations. For the greater part, the values of these molecular parameters are not known, and so F_{is} and F_{anis} are more conveniently expressed by quantities that are accessible to measurement. A relation between anisotropic light scatter and optical birefringence arising in an isotropic medium due to the effect of a very intense light beam, is derived by generalizing Buckingham's theory (Ref. 6; 1956) to multi-component systems. Furthermore, it is proved that F_{is} can be expressed in terms of the molecular refraction of the medium. From the present paper it results that in a multi-component system, in addition to light scatter on fluctuations of density and concentration, as well as of anisotropy and orientation of the molecules, an essential part is played by light scatter

Card 4/5

86670

P/045/60/019/006/009/012
B011/B059

24.5400

AUTHOR: Kielich, S.

TITLE: Rayleigh's Ratio and the Turbidity of Imperfect Gases

PERIODICAL: Acta Physica Polonica, 1960, Vol. 19, No. 6, pp. 711 - 730

TEXT: According to the author, information on the nature of intermolecular forces may be obtained from the divergence between light scatter in a compressed and in an ideal gas. For this reason the author suggests a theory of the virial coefficient for Rayleigh's ratio S and the turbidity h of imperfect gases. By statistical mechanics of classical light scatter, S and h are given by formulas (2.1) and (2.2) which contain the molecular S_m^{is} and S_m^{anis} of isotropic and anisotropic light scatter, respectively. Here, these constants are expanded in powers of 1/V (V - molar volume of the scattering medium with refractive index n). The coefficients of this expansion are termed the virial coefficients of isotropic and anisotropic light scatter, respectively. The first virial coefficients account for

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86670

Rayleigh's Ratio and the Turbidity of Imperfect Gases

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B011/B059

light scatter in an ideal gas, the second for a gas with a pairwise interaction between the molecules, the third for interaction of three molecules, and so forth. The second virial coefficients are calculated for various models of dipole and quadrupole molecules. In the first approximation, a molecule of the imperfect gas is assumed to possess the polarizability of an isolated molecule. In further approximations to this theory, the molecules are assumed to have a polarizability that is affected by their neighbors, and to exhibit the effect of hyperpolarizability. Using the formulas obtained, the second virial coefficients are computed for various dipole gases (Table II). Professor Doctor A. Piekara is thanked for helpful discussions. There are 2 tables and 15 references: 7 US, 6 British, 1 Polish, and 1 French.

ASSOCIATION: Institute of Physics, Polish Academy of Sciences, Poznań

SUBMITTED: April 28, 1960

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P/045/60/019/006/009/012
B011/B059

Table II. Theoretical values of virial coefficients B_S^{is} and B_S^{anis} of light scattering, in cm^3/mol^2.

		central-forces potential	dipole-induced dipole interaction	dipole-dipole interaction	total
NH_3	$B_S^{is} \times 10^3$	7.36	6.63	32.11	46.10
$T = 320°K$	$B_S^{anis} \times 10^4$	0	0.003	0.45	0.453
CH_3F	$B_S^{is} \times 10^3$	9.06	4.53	20.83	34.42
$T = 320°K$	$B_S^{anis} \times 10^4$	0	0.02	3.04	3.06
CH_3CN	$B_S^{is} \times 10^3$	153.72	67.64	707.11	928.47
$T = 400°K$	$B_S^{anis} \times 10^4$	0	0.2	113.0	113.20

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B011/B059

$$S = \frac{(n^2+2)^2}{9V}\left(S_m^{\text{is}} + S_m^{\text{anis}}\right), \tag{2.1}$$

$$h = \frac{16\pi(n^2+2)^2}{27V}\left(S_m^{\text{is}} + \frac{5}{13}S_m^{\text{anis}}\right), \tag{2.2}$$

Card 4/4

6,4780
24.3200 (1051,1106,1114)

P/045/61/020/001/005/006
B108/B209

AUTHOR: Kielich, S.

TITLE: Supplementary note to the paper: Molecular Theory of Light Scattering by Multi-component Systems

PERIODICAL: Acta Physica Polonica, v. 20, no. 1, 1961, 83-88

TEXT: The present article is to supplement an earlier paper (S. Kielich, Acta phys. Polon., 19, 573 (1960)) and brings a discussion of the scattered light intensity for the case of a system whose various components consist of quadrupolar, anisotropically polarizable and hyperpolarizable molecules. The light intensity scattered through an angle ϑ is given by formula

X

$$I(\vartheta) = \frac{8\pi^4 I_0}{45\lambda^4 R_0^2}\{5(1+\cos^2\vartheta)F_{is}(s) + (13+\cos^2\vartheta)F_{anis}(s)\} \qquad (1)$$

where I_0 and λ denote intensity and wave-length, respectively, of the

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69380

Supplementary note to the paper: ... P/045/61/020/001/005/006
B108/B209

incident light, R_0 - the distance of the observer from the scattering center. $F_{is}(s)$ and $F_{anis}(s)$ are the molecular factors of isotropic and anisotropic light scattering. (Kielich, 1960). The expansion

$$\left(\frac{\partial m_\alpha^{(p,i)}}{\partial E_x^{(p,i)}}\right)_{E=0} = \left\{\alpha_{\alpha\beta}^{(p,i)} + \beta_{\alpha\beta\gamma}^{(p,i)} F_\gamma^{(p,i)} + \frac{1}{2}\gamma_{\alpha\beta\gamma\delta}^{(p,i)} F_\gamma^{(p,i)} F_\delta^{(p,i)} + \right.$$
$$\left. + \frac{1}{3} B_{\alpha\beta:\gamma\delta}^{(p,i)} F_{\gamma\delta}^{(p,i)} + \dots\right\}\left\{\delta_{\beta x} + \frac{\partial F_\beta^{(p,i)}}{\partial E_x^{(p,i)}}\right\}_{E=0}, \quad (4)$$

for the total differential polarizability tensor of the molecule in the medium (for $\vec{E} = 0$) is substituted in the expressions for F_{is} and F_{anis}. The notations are as follows:

$\alpha_{\alpha\beta}^{(p,i)}$ - polarizability tensor of the p-th molecule of species i,

$\beta_{\alpha\beta\gamma}^{(p,i)}$, $\gamma_{\alpha\beta\gamma\delta}^{(p,i)}$ - hyperpolarizability tensors. The tensor $B_{\alpha\beta:\gamma\delta}^{(p,i)}$ accounts for the additional polarization of the p-th molecule of species i

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as induced by the field gradient $F_{\alpha\beta}^{(p,i)}$ at the center of molecule p of species i, which is due to the electric-charge distributions of all the other molecules in the presence of the electric field E_α. $F_\alpha^{(p,i)}$ denotes the α-component of the molecular field. For non-dipolar molecules with axial symmetry, the following tensor elements only are non-vanishing: $\alpha_{\alpha\beta}$, $\Theta_{\alpha\beta}$, $\gamma_{\alpha\beta\gamma\delta}$, $B_{\alpha\beta:\gamma\delta}$ (axis of symmetry parallel to 03, see A. D. Buckingham, J. chem. Phys., 30, 1580 (1959)).

$$\begin{aligned} &\alpha_{11} = \alpha_{22} = \alpha_{\perp}, \quad \gamma_{1111} = \gamma_{2222} = 3\gamma_{1122} = \gamma_{\perp}, \quad \gamma_{1133} = \gamma_{2233} = \gamma_{\parallel}, \\ &\alpha_{33} = \alpha_{\parallel}, \quad \gamma_{3333} = \gamma_{\parallel}, \quad \Theta_{33} = -2\Theta_{11} = -2\Theta_{22} = \Theta, \\ &B_{33:33} = -2B_{33:11} = -2B_{33:22} = 2(B_{11:11} + B_{11:22}) = B, \end{aligned} \tag{15}$$

(15)

where Θ is the quadrupole moment and B the quadrupole polarizability of the

molecule. With respect to (15) and for $\lambda \gg r_{ij}$, F_{is} and F_{anis} assume the forms

$$F_{is} = 9N \sum_{i,j} \alpha_{(i)} \alpha_{(j)} \{1 + A_{is}^{(ij)} + II_{is}^{(ij)}\} \times$$
$$\times \left\{ x_i \delta_{ij} + x_i x_j \int \left[g_{ij}(\tau) - \frac{N}{V} \right] d\bar{\tau} \right\}, \qquad (16)$$

$$F_{anis} = 9N \sum_{i,j} \alpha_{(i)} \delta_{a(i)} \alpha_{(j)} \delta_{a(j)} \{1 + A_{anis}^{(ij)} + II_{anis}^{(ij)}\} \times$$

and

$$\times \left\{ x_i \delta_{ij} + \frac{1}{2} x_i x_j \int (3\cos^2 \Theta_{ij} - 1) \left[g_{ij}(\tau) - \frac{N}{V} \right] d\bar{\tau} \right\}, \qquad (17).$$

Here, Θ_{ij} denotes the angle between the axes of symmetry of the molecules of species i and j. $g_{ij}(\tau)$ - the distribution function and $\Omega^2 d\bar{\tau} = d\vec{r}_{ij} d\omega_i d\omega_j$, where $\Omega = \int d\omega_i$. The quantities $A_{is}^{(ij)}$ and $A_{anis}^{(ij)}$ in

$$A_{is}^{(ij)} = \tfrac{1}{3}\left(\lambda_{\parallel}^{(i)}\nu_{\parallel}^{(i)} + 2\lambda_{\perp}^{(i)}\nu_{\perp}^{(i)}\right) + \tfrac{1}{3}\left(\lambda_{\parallel}^{(j)}\nu_{\parallel}^{(j)} + 2\lambda_{\perp}^{(j)}\nu_{\perp}^{(j)}\right) + \tfrac{1}{9}\left(\lambda_{\parallel}^{(i)}\nu_{\parallel}^{(i)} + 2\lambda_{\perp}^{(i)}\nu_{\perp}^{(i)}\right)\left(\lambda_{\parallel}^{(j)}\nu_{\parallel}^{(j)} + 2\lambda_{\perp}^{(j)}\nu_{\perp}^{(j)}\right). \quad (18)$$

and

$$A_{anis}^{(ij)} = \frac{\lambda_{\parallel}^{(i)}\nu_{\parallel}^{(i)} - \lambda_{\perp}^{(i)}\nu_{\perp}^{(i)}}{\lambda_{\parallel}^{(i)} - \lambda_{\perp}^{(i)}} + \frac{\lambda_{\parallel}^{(j)}\nu_{\parallel}^{(j)} - \lambda_{\perp}^{(j)}\nu_{\perp}^{(j)}}{\lambda_{\parallel}^{(j)} - \lambda_{\perp}^{(j)}} + \left(\frac{\lambda_{\parallel}^{(i)}\nu_{\parallel}^{(i)} - \lambda_{\perp}^{(i)}\nu_{\perp}^{(i)}}{\lambda_{\parallel}^{(i)} - \lambda_{\perp}^{(i)}}\right)\left(\frac{\lambda_{\parallel}^{(j)}\nu_{\parallel}^{(j)} - \lambda_{\perp}^{(j)}\nu_{\perp}^{(j)}}{\lambda_{\parallel}^{(j)} - \lambda_{\perp}^{(j)}}\right). \quad (19)$$

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account for the effect of the anisotropy of the molecular field on isotropic and anisotropic light scattering, respectively. $H_{is}^{(ij)}$ and $H_{anis}^{(ij)}$ account for the additional contribution to isotropic and anisotropic light scattering due to higher-order effects such as hyperpolarizability of the molecules and polarizability of molecular quadrupoles.